DRIVE SHAFT & UNIVERSAL JOINTS

1996 Drive Axles - Universal Joints

DESCRIPTION & OPERATION

Drive shaft is used to transmit power from transmission to rear axle assembly. Use proper universal joint alignment angle to provide smooth operation of drive shaft. Check front and rear universal joint angles with vehicle at proper ride height and a full gas tank. Adjust front universal joint by shimming transmission mount. Adjust rear universal joint angle by shimming transmission mount, repositioning pinion nose or by replacing rear control arms.

INSPECTION

RIDING HEIGHT & UNIVERSAL JOINT ANGLE

1. Ensure vehicle is at proper ride height with a full tank of gasoline. Measure axle tube-to-frame height (ride height) from top of axle tube to bottom of frame. See **Fig. 1**. Bounce vehicle and allow to return to normal ride height before measuring. Ensure ride height is within specification. See **RIDE HEIGHT & UNIVERSAL JOINT ANGLE SPECIFICATIONS** under ADJUSTMENTS.
2. If ride height is not within specification on models with electronic suspension, adjust height sensor. See **HEIGHT SENSOR** under ADJUSTMENTS. On models without electronic suspension, add weight to trunk to obtain correct ride height.
3. With vehicle level, measure universal joint angles. Clean bearing caps. Install Inclinometer (J-23498-A) on rear drive shaft bearing cap. See **Fig. 2**. Bearing cap must be vertically aligned (straight up and down). Center bubble in sight glass, and record reading.
4. Remove inclinometer, rotate drive shaft 90 degrees, and install inclinometer on drive yoke bearing cap. Measure angle, and subtract smaller reading from larger reading to determine rear universal joint angle.
5. Attach Inclinometer Adapter (J-23498-20) to front drive shaft bearing cap. See **Fig. 3**. Attach inclinometer to adapter, and repeat procedure used on rear universal joint to obtain front universal joint angle.

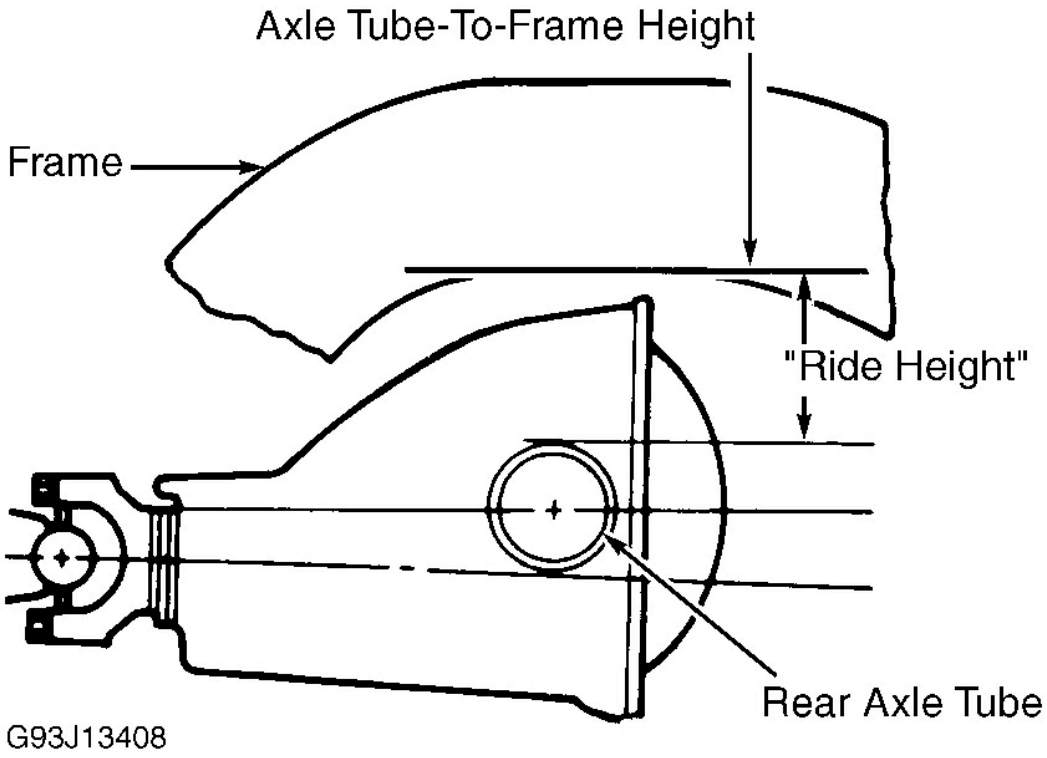

Fig. 1: Checking Axle Tube-To-Frame Height
Courtesy of GENERAL MOTORS CORP.

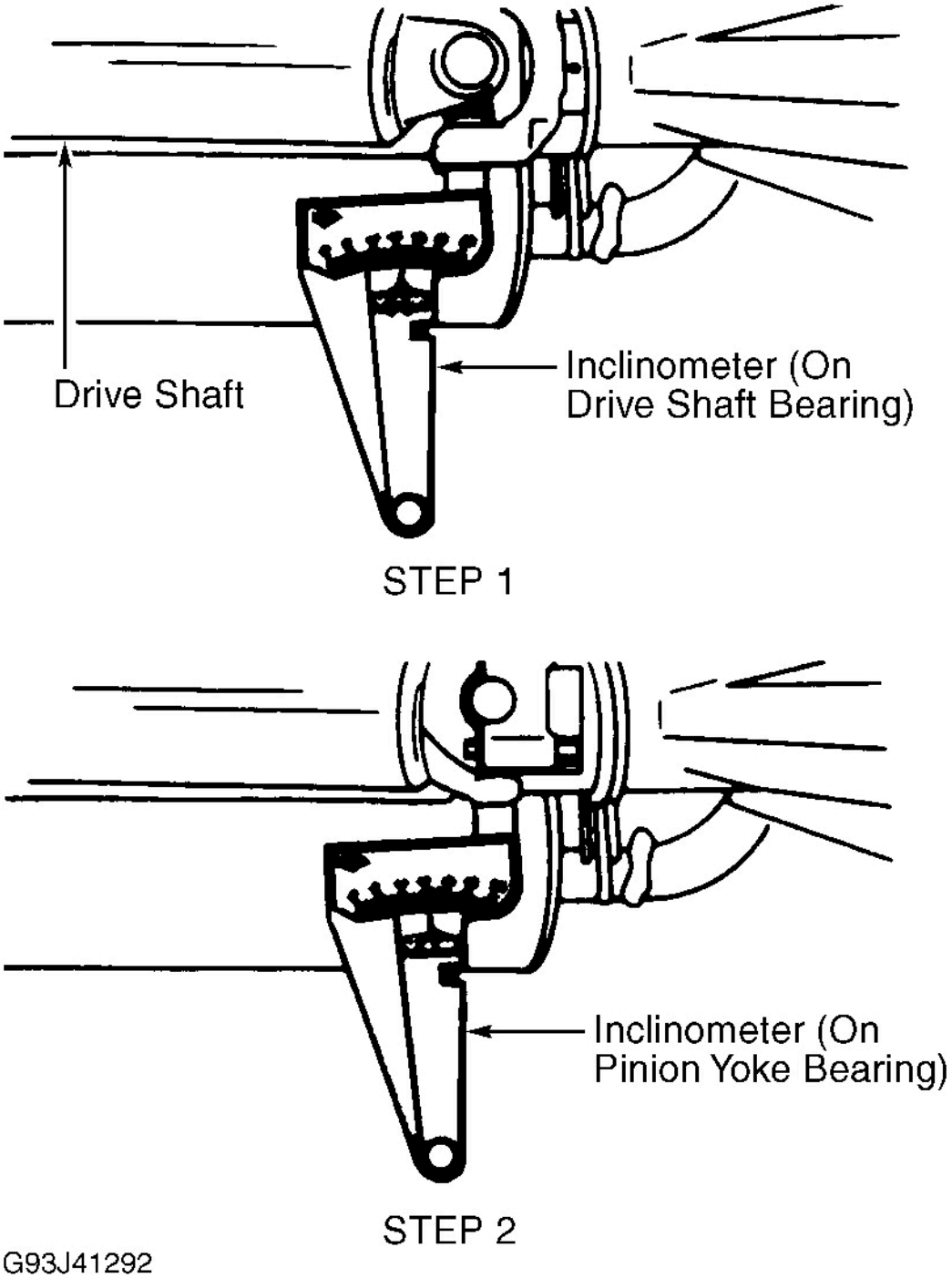

Fig. 2: Measuring Rear Universal Joint Angle
Courtesy of GENERAL MOTORS CORP.

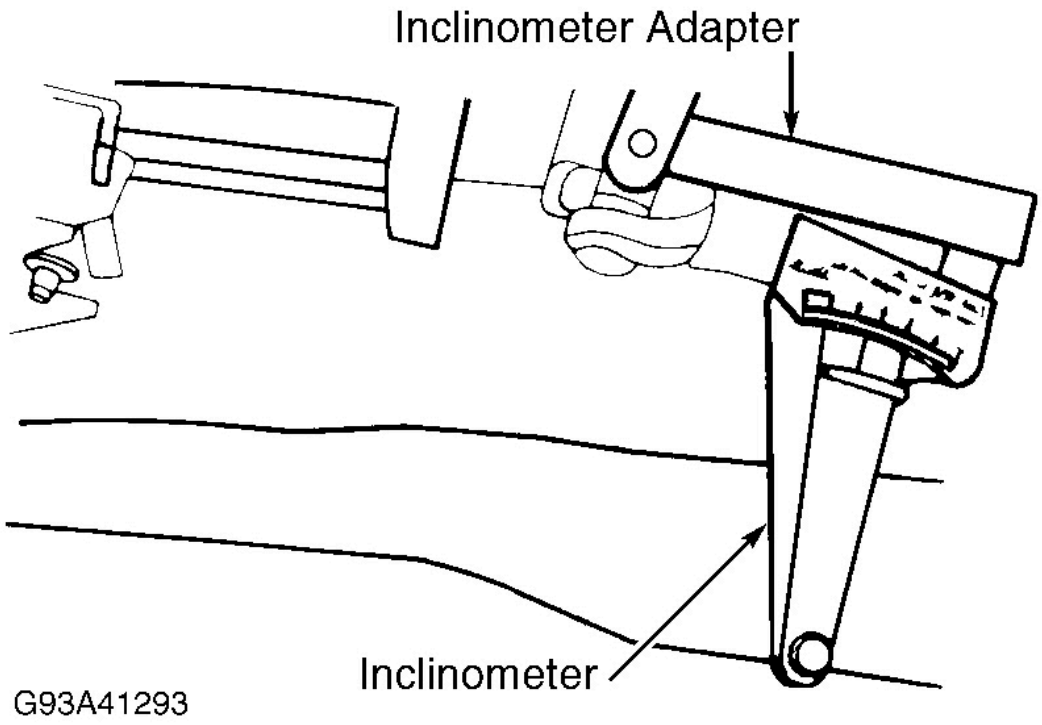

Fig. 3: Measuring Front Universal Joint Angle
Courtesy of GENERAL MOTORS CORP.

ADJUSTMENTS

HEIGHT SENSOR

CAUTION: Control arm-to-sensor arm link must be attached during adjustment.

1. With link attached to metal arm, loosen metal arm-to-height sensor plastic arm lock bolt. See **Fig. 4**. To increase ride height, move plastic arm upward. To decrease ride height, move plastic arm downward. Tighten lock bolt.
2. For every one-degree change in angle arm, the trim (riding) height will change by approximately 1/4" (6 mm). The arm angle may be changed a total of 5 degrees, approximately 1 1/4" (32 mm).

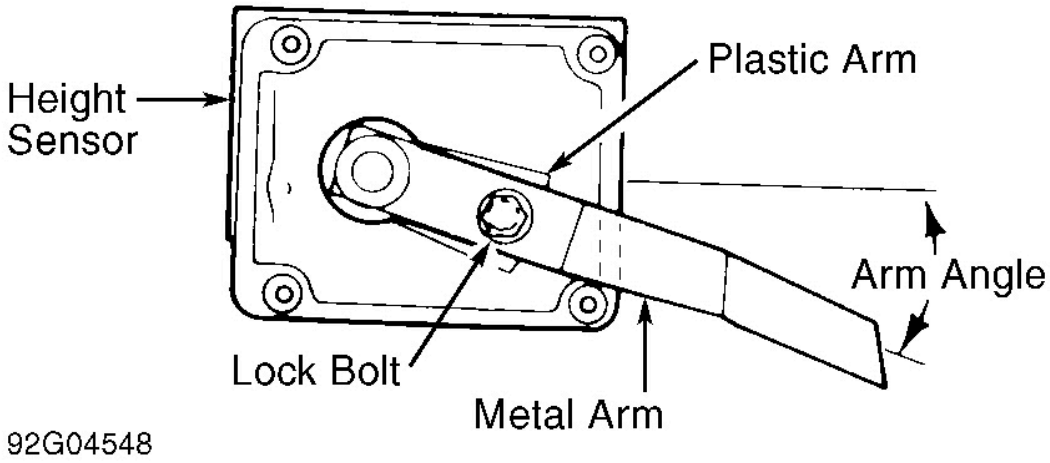

Fig. 4: Adjusting Height Sensor
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION SHIMMING

Adding one shim at transmission mount decreases front universal joint angle 1/2 degree and increases rear angle 1/4 degree. Removing one shim from transmission mount increases front universal joint angle 1/2 degree and decreases rear angle 1/4 degree.

NOTE: Production transmission mount bolt is M10-1.5 x 35 mm. When using 2 or more shims, a M10-1.5 x 50 mm bolt must be used.

REPOSITIONING PINION NOSE

Rear universal joint angle corrections +/-1 degree can be made by loosening all rear suspension control arm bolts. Reposition pinion nose up or down, and tighten all bolts.

CONTROL ARM CHANGE

By using different length control arms available for universal joint angle service, joint angle can be corrected. Rear joint angle can be corrected to within +/-2 degrees. Front joint angle can be corrected to within +/-1/3 degree. See **RIDE HEIGHT & UNIVERSAL JOINT ANGLE SPECIFICATIONS**.

RIDE HEIGHT & UNIVERSAL JOINT ANGLE SPECIFICATIONS

Application	Ride Height In. (mm)	(1) Ft Joint (°)	(2) Rr Joint (°)
Sedan			
Caprice & Impala SS			
7.6" Axle			

FE1 Suspension	5.59 (142)	1.6	2.6
8.5" Axle			
FE1/FE2 Suspension	5.98 (152)	1.3	2.6
FE2/F41 Suspension	5.51 (140)	1.3	2.6
FE3 Suspension	5.24 (133)	1.3	2.6
7B3 Suspension			
215/75R15	5.91 (150)	1.3	2.6
225/70R15	6.02 (153)	1.3	2.6
235/70R15	5.71 (145)	1.3	2.6
Roadmaster			
FE1/FE3 Suspension	5.79 (147)	1.3	2.6
FE2/F41 Suspension	6.06 (154)	1.3	2.6
FE2 Suspension	5.98 (152)	1.3	2.6
Fleetwood			
8.5" Axle	6.0 (152)	1.75	2.66
9.5" Axle	6.0 (152)	1.875	(3) 1.66
Wagon			
Caprice & Roadmaster			
8.5" Axle			
F40 Suspension			
225/75R15	4.84 (123)	1.4	3.0
225/70R15	5.28 (134)	1.4	3.0

(1) Angles may vary within +/-1/3 degree.

(2) Angles may vary within +/-2/3 degree.

(3) Single universal joint. With constant velocity (dual), rear universal joint angle is .875 degree.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS - "B" BODY

TORQUE SPECIFICATIONS - "B" Body

Application	Ft. Lbs. (N.m)
Drive Shaft "U" Joint Bolts	16 (22)
Rear Axle Lower Control Arm	
Bolt	140 (190)
Nut	107(145)
Rear Axle Upper Control Arm Bolt	
Front	136 (185)
Rear	88 (120)
Rear Axle Upper Control Arm Nut	

Front	107 (145)
Rear	85 (115)
Rear Stabilizer Shaft Bolt	63 (85)
Rear Stabilizer Shaft Bracket Bolt	21 (29)
Transmission Mount	
Bolts	35 (47)
Nut	30 (41)
	INCH Lbs. (N.m)
Height Sensor Control Arm Lock Bolt	27 (3)

TORQUE SPECIFICATIONS - "D" BODY

TORQUE SPECIFICATIONS - "D" Body

Application	**Ft. Lbs. (N.m)**
Drive Shaft "U" Joint Bolts	(1) 16 (22)
Rear Axle Housing-To-Upper Control Arm	
Bolt	83 (113)
Nut	74 (100)
Rear Axle Lower Control Arm	
Bolt	114 (155)
Nut	91 (123)
Rear Crossmember-To-Rear Axle Upper Control Arm	
Bolt	114 (155)
Nut	95 (130)
Rear Stabilizer Shaft Bolt	63 (85)
Rear Stabilizer Shaft Bracket Bolt	21 (29)
Transmission Mount	
Bolts	35 (47)
Nut	30 (41)
	INCH Lbs. (N.m)
Height Sensor Control Arm Lock Bolt	27 (3)

(1) On models with coachbuilder equipment option, tighten to 70 ft. lbs. (95 Nm).